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# MONTHLY BULLETIN

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# EDITORIAL — SOME HIGHLIGHTS.

## Tamil Nadu's Perspective Plan 1972 - 84.

*Preparation :*

After its first four months of work, the State Planning Commission, meeting with its Chairman, the Chief Minister, has announced its decisions concerning the production of the 12-year perspective plan for Tamil Nadu, 1972-84, which is the main task entrusted to it. (See Vol. 1, Nos. 4 and 6 of the Bulletin). First the Commission will produce a Draft Discussion Frame so that there may be a wide ranging discussion by legislators, businessmen, academic personnel and local government bodies concerning the major options facing the people and the State and in light of which the plan will be finally drafted. Second the methodology for formulating the perspective plan will be: (a) district planning, (b) sectoral programming and (c) growth centres' studies. Third under the time-table for the above, the perspective plan will be completed and published in March 1973.

*Draft Discussion Frame :*

The Draft Discussion Frame will set forth for study and comment the hypothesis concerning rates of growth, per capita income, consumption, savings and investment levels, and sectoral programmes together with the strategy, policies and programmes that are needed and involved for the attainment of the targets. This frame which will be available by the end of the year should be studied and debated by the State Legislature, District Development Councils, the Union Panchayats and the business, labour and academic world so that there is the widest range of participation in the establishment of strategies and policies and concensus on the objectives and targets.

*District Planning :*

The Development District is to be the basic planning unit in the State so that the perspective plan will be a function of local

needs, resources and growth possibilities. The Collector in consultation with the District Development Council will be the District Planning Authority. District Planning guidelines have been issued by the Commission setting forth

(a) the twenty-three types district data that must be collected and the studies that must be made ;

(b) the subject areas which are under the control of the District Development Authority (Agriculture, Small Industries, Infra-structure and Social Services) in which it should establish an integrated plan;

(c) The six planning steps involved in its establishment which comprise, inter alia, identifying the main economic activities to be developed, listing the subsidiary and supplemental activities needed in a priority order, determining the infrastructural facilities, inputs and services needed by the main economic activities, indicating the basic requirements of backward areas and classes, assessing the physical and financial resources and finally correlating the requirements of various areas, determining the location of projects and integrating them spatially and functionally at least cost and maximum coverage ;

(d) Indicating the priorities and phasing of the plan in light of resource availabilities-State and Local.

Within each district the Commission has identified the most backward areas with a view to developing special programmes for them. For such planning each District Development Authority is being equipped with a planning cell which will be supervised by the Collector and comprise a planning officer trained in techno-economic work. The District Statistics Officer, together with the advisory services of the District Officers in Industry, Agriculture, Health, Education, Housing, etc. The Commission will advise in the work of the District Planning Cell and each Member of the Commission will assist three districts in their planning tasks. District plans so formulated must be forwarded to the Commission within a period of six months by June 1972.

*Sectoral Programming :*

The Tamil Nadu economy has been divided into 15 sectors :

(1) Urban Development including urban housing.
(2) Large Industries.
(3) Small Industries.
(4) Education, Science and Technology.
(5) Health and Nutrition.
(6) Forestry.
(7) Human Resources, Social Change for Economic Development.
(8) Mobilisation of financial resources ; growth rate, State income and fiscal policy.
(9) Rural Development including Rural Housing ; Tourism.
(10) Agriculture.
(11) Animal Husbandry.
(12) Fisheries.
(13) Mineral Resources.
(14) Fuel and Power.
(15) Transportation.

Each task force is headed by a Member of the Commission and consists of 7 to 10 members competent in the area covered. The sectoral plans will also be completed within the six months' period and will feed into the perspective plan.

*Growth Centres Study :*

A third input into the State perspective plan is the study of areas which are in need of growth or where growth is already under way and calls for acceleration and/or consolidation. In the former group of backward areas are the two districts of Dharmapuri and Ramanathapuram. The Commission is undertaking immediately a techno-economic survey of each of these two districts in order to identify growth sparking industrial, agricultural and agro-industrial programmes, simultaneously with the State Government/IDBI Study of industries which can now be located and started up in the Dharmapuri and Ramanathapuram Districts. In the second category of centres which are already

experiencing growth and where ancillary industries, infra-structure and related agricultural activities need to be intensified to make them growth centres, the Commission has identified, to start with, the Tuticorin Complex, the Salem-Neyveli complex and the Kalpakkam-Manali complex. In these cases, the necessary feasibility, engineering and evaluation studies will be undertaken by the Commission. The Commission will be examining other growth centres in the State for inclusion in this part of the plan. Thus, a long term programme for these two groups of growth centres will constitute one of the programme bases for the perspective plan.

The Commission's work on the Draft Discussion Frame, its evaluation of the State Plan performance over the Third and Fourth Plans and its development of an econometric model for the State will continue simultaneously as the district planning, sectoral programming and growth centres study are under way. In all this work, the State Planning Commission works closely with the Union Planning Commission both in regard to all India priorities, strategy, and resources and in the pioneering demonstration that all planning must begin from the people, who are not only the subject but also the object, not only the instrument, but also the end of all plans. The Tamil Nadu essay, which is complex and difficult is the first demonstration of the truth which has been accepted verbally but has not been acted upon in practice, of planning from below, of planning engaging the people at the State and District level.

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**The National Economic Scene.**

The State Planning Commission's programming decisions must be set against the grim national economic scene portrayed in the Annual Report of the Reserve Bank of India of June 1971, the mid-term Plan appraisal of the Union Planning Commission and the Economic Review of the Union Cabinet. The internal and external factors endangering the economy—deficit financing, price inflation and weakened foreign exchange and trade position were analysed in the last two issues of the Bulletin (Vol. I, Nos. 8

and 9). Industrial Growth which should be around 10 to 12 per cent has been declining relentlessly from 4 per cent last year 1970-71 to 1.5 per cent for the first six months of this fiscal year. The physical targets for the first two years of the Plan are 10 to 15 per cent short in performance. The short-fall of Central Sector's investment is Rs. 400 crores, partially made up by the States, exceeding their investment by Rs. 200 crores. Shortages have developed in key industrial raw materials like cotton, oil seeds, steel, in capital equipment, component and spare parts together with set backs in transport and power and the worsening industrial relations. Exports in general have registered a sharp rise by over Rs 100 crores during the first four months, compared to the similar period in 1970-71, mainly due to the increased shipments of engineering goods, tea and gunnies, despite a marked fall in the exports of cotton and iron ore. The fall in iron ore exports is due to the 1 to 2 year delay in the Central sector execution of the extension facilities of the four key harbours at Haldia, Visakhapatnam, Pardeep and Madras. Hence, export target in iron ores has thus been cut back by 18 per cent for the Fourth Plan from 31 million tonnes to 25.5 million tonnes. But the over all improvement in exports is more than cancelled by the larger imports in steel, cotton, oils, nonferrous metals and components, increasing the export-import gap for the first four months of the current fiscal year by 30 per cent vis-a-vis the same period last year. The supply of goods, basic and consumers, have registered absolute declines, iron and steel, industrial machinery, transport equipment, textiles, etc. On the other hand, money supply has continued "to expand at a high rate", states the Reserve Bank of India. The increase in money supply for the year ending June 1971 was 13.3 per cent to which must be added the increase of 9.8 per cent as at June 1970. The major factor in this expanded money supply is the increase of net bank credit to government from Rs 2 crores at June 1970 to Rs 924 crores as at June 1971, involving an increase in the total volume of money by 20 per cent. This money supply increase is due to the operations of Central Government and some State Governments. These are apart from the expected Bangla Desh expenditure of Rs 500 crores instead of the budgeted Rs 260 crores and the flood compensation of Rs 130 crores instead of the Rs 50 crores budgeted. The result is the simple and full applica-

tion of the quantity theory of money. The strong pressure on prices, warns the Reserve Bank of India, continues particularly in raw cotton, jute, chemicals, machinery, transport equipment and steel. The price increases are cumulative for two years running. For cotton 13.9 per cent at June 1971 plus 6.8 per cent at June 1970; for jute maunfactures 14.8 per cent in June 1971 plus 12.4 per cent in June 1970; for iron and steel 10.4 per cent in June 1971 plus 7.4 per cent in June 1970.

The immediate actions to be taken to counter these forces of declining industrial growth, delayed or postponed expansion programmes, reduced public sector investments, stagnation in the private sector and the abnormal price rises are clear. They must be put into force without further delay. They include management and structural reforms of the public sector undertakings so that they work to capacity, increase in public sector plan investment, expansion of credit to the corporate sector, a 10 per cent reduction in non-development expenditure to meet the Bangla Desh refugee costs, stopping resort to deficit financing and helping States like U.P., Bihar, and Bengal to raise the resources to which they have committed themselves, intensifying the credit flow and investment in cash crops particularly cotton and oil seeds, encouraging the private sector to expand its capacity and mobilising the growing rural surplus into productive investment. Immediately the anti-inflationary action called for is a sharp reduction in the non-development expenditures of the Central Government and pressure on the nine deficit States for mobilising State resources through levy of agricultural Income Tax floating rural debentures, taxing urban property, collecting their tax arrears of Rs 400 crores and imposing viable rates on power, water and transport.

For Tamil Nadu, this situation of national economic stagnation is both a challenge and an opportunity. The forces which are within the Control of the State are moving forward hearteningly. In the mobilisation of internal resources, the State is at the forefront, having exceeded its target by 41 per cent. The industrial, agricultural and infra-structural services and production are continuing to grow at around 10 per cent. A special effort needs to be made by the State in increasing the production of cotton, oil seeds, spices and in developing ancillary and small

industries around Coimbatore, Tiruchirapalli, Chingleput and Tuticorin. The Madras harbour extension work should be speeded up as a means of restoring to some extent the cut in the iron ore export target. A further effort should be made to mobilise the growing rural resources in the State. Special attention needs to be paid to the four industries of textiles, cement, sugar and fertilizers, in which the State has a growing surplus.

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**Industrial Indicators.**

*Textiles :*

One of the areas where the State needs to make a special effort is in its textiles exports. For four years since 1968, there has been a steady expansion of textiles exports from the State. The textile industry 1970 production increase (67 per cent in yarn and 32.5 per cent in fibres) provides a good basis for further development. But due to the rise in cotton prices, the reduced offtake of UAR and UK and the declining exports to markets in USA, Canada and Eastern Europe, the export prospects for the current year have dimmed. The decline from 418.5 million square metres of cotton manufactures in 1969 to 403.16 million square metres in 1970 is likely to continue unless two steps are taken. There is need to keep costs down. Here the current trends are disquieting in terms of raw cotton prices which have registered a 75 per cent increase in some varieties, the unviable labour output ratio and the lagging rate of modernisation. Improvements are needed on all three fronts in the state textile production, if it is to remain competitive. The other dimension for a pick up in exports is the promotion of intra developing countries' trade, increasing our exports to other countries of Asia — Burma, Thailand, Nepal and Indonesia—as well as to the countries of Africa. The recent successful visit of the Indian Handloom Study Team to the countries of Africa and the resulting pick up in the orders for Karur bed spreads, Madras handkerchiefs, etc. must be followed up by similar textiles machines to other Asian and African countries. The textiles export market must also be diversified by exploration in the European Economic Community, U.S. and Canada. The Generalised System of Preferences

established in the international strategy of the Second Development and the deterioration in the terms of trade of the State, the country and the developing world must be arrested through agreements reached at UNCTAD III, which is to meet next month in Lima, Peru.

*Cement* :

A second area where the State is in surplus is cement. The cement industry in the State presents a complex picture. India Cements with its production units at Talaiyuth (Tirunelveli District) and Sankaridurg (Salem District) has a production capacity of 2.5 million tonnes and is doing well. On the other hand, Tamil Nadu Cements at Alangulam and Muduvathur under the Tamil Nadu Development Corporation is working well below capacity and facing heavy depreciation charges, resulting in a Rs. 25 lakh deficit balance sheet. The cement situation is somewhat special. The demand is on the rise and will continue to be that during the balance of the Fourth and currency of the Fifth Plans. The continuing agricultural improvement, the increased use of the floor saving device, the industrial, housing and the highway demands for cement involve an annual increase of 10 per cent for this decade reaching 30 million tonnes in 1980. On the supply side the capacity will be around 24 million tonnes in 1975 with an actual production of 20 million tonnes. With this gap between supply and demand, the problem of the distribution machinery and net-work becomes of crucial importance. The major sources of supply are in the South and the major consumers are in the North and North East. The location of future units of cement production is thus a complex issue. The supply deficit areas of the North and North East are the natural venue for such new units. Such a decision however involves moving the requisite raw material from the South to the North. There is a slight comparative cost and price advantage in producing cement in the South and West and supplying the northern deficit region over that of establishing new units there and shipping the necessary limestone. What is thus needed is the adequate provision of railway wagon facilities and the pooling of freight charges to ensure a uniform price. Further a decision is needed with regard to the location of future units, so that the industry in the State can plan its future programmes with some certainty.

*Sugar :*

A third product in which the State has a surplus is sugar. The sixteen mills currently operating in the State will have four more added to them in the co-operative sector. They have a cane supply of 28.5 lakh quintals grown in 2.7 lakh acres. The industry is one of the most modern and effective in the country, having exceeded the plan target in recording a growth rate of 7.4 per cent during 1970. Despite this sound performance, the industry faces several problems. First the functioning of the distribution network of the surplus sugar to the consumers in the North continues to be unsatisfactory and results in the accumulation of stocks. The recent Reserve Bank of India directive curtailing bank advances against sugar by raising the minimum margins and increasing the minimum rate of interest to 12 per cent has been effective in correcting the speculative holdings of sugar stocks. But these measures cannot easily distinguish between speculative holdings and enforced holdings due to transport bottlenecks. A second problem is that the sugar mills act as growth centre in backward and neglected areas, provided the ancillary activities are continually fed by an expanding sugar factory. It is here that the third issue of the cane price policy becomes decisive. At the moment the policy is hanging in the air. The Agricultural Prices Commission has recommended that the statutory price should continue at Rs. 7.37 per quintal for a basic recovery of 9.4 per cent, with a premium of 6.6 Paise for every 0.1 per cent increased recovery and a similar discount for lower recoveries upto 8.4 per cent. The industry has recommended a higher cane price to counter the expected fall in cane production of somewhere between 5 to 10 per cent (in Tamil Nadu the decrease will be less than 40,000 acres, 0.5 per cent). ISMA has recommended Rs. 8 per quintal at 9 per cent recovery for Tamil Nadu and Rs. 9/- per quintal linked to 9 per cent recovery for all other regions, to meet Tamil Nadu's request for parity between inter-regional cane costs. The Union Agricultural Ministry has recommended a price of Rs. 8/- per quintal. The whole issue has been postponed until the meeting of the Chief Ministers, the first of which is at mid October and the second early December. The most urgent action needed, if the sugar industry in the State is not to receive a set back is for an immediate announcement of the cane prices for

1971-72. This is now needed so that cane growers can plan their production for the next season and the factories can programme their production in light of the raw material availabilities, costs and demand forecasts.

Incidentally, this raises a question in the multifaceted problem of Central-State relations. There is a case for Central co-ordination in the case of sugar where the State has an excess and the consumers are found scattered in the other States. But there is little excuse for the long delays that Central decisions seem to take, introducing uncertainties in a vital industry like sugar. All centralisation is time consuming, just as all decentralisation is economy reducing. There needs to be a balance struck in this case. Further the Central review and decision involves a price that the most efficient sector of the industry that is located in this State has to pay. With modern Plant and management and a high recovery, the industry in this State is equivated with the small unviable and antiquated factories in U. P. and Bihar where there are 113 factories working on machinery which is 32 to 67 years old. In an industry where a downward difference of 0.1 per cent recovery can cost Rs. 4 lakhs, the agro-climatic conditions in these two States for cane growing, unlike Tamil Nadu, involves such downward differences. In matters like these there is a case for proposals being made by the State Governments and quick decisions being arrived at by the Centre.

*Fertilizers :*

The fourth major area where the State is developing a huge surplus is in Fertilizers. The Madras Fertilizers is the biggest in the country. Its annual report states that the Plant had been accepted as ready for use and went on steam last month. As emphasised in Issue No. 5 of the Bulletin, the marketing plans of the plant through Shaw Wallace, E.I.D. Parry, the State Agro-Industries Corporations and the Government Co-operatives in the Southern States are of vital importance in popularising and distributing the product. The Tuticorin Naptha based Fertilizer Project, will be the biggest in Asia (for details see Vol. I, No. 8 of the Bulletin). Within the Tuticorin complex, the private sector firm, the Southern Petro-Chemical Industries Corporation, has

submitted to the State Government the feasibility report for starting a Soda Ash Ammonium Plant with a daily capacity of 200 tonnes at a capital cost of Rs. 9 crores. At present 90 per cent of soda ash is produced in Maharashtra and has to be transported to the State. This can be economised. The present demand in the south for laundry, glass, silicate and bichromate industries of 46,000 tonnes will rise to 100 thousand tonnes by 1980. The Tuticorin Plant can meet current consumption levels. For the country by 1974 all plants will produce 5,27,000 tonnes against a demand 6,17,000 tonnes which will rise to 7,80,000 tonnes in 1980. The Tuticorin location facilitates both the inputs of salts, ammonia and carbon-dioxide available locally and export perspectives through the port to neighbouring Asian countries. There is a further particular interest of the State in the Tuticorin Soda Ash Plant. Ammonia Chloride is a straight fertilizer for paddy and the plant will be one means of relieving the acute shortage of this multipurposed product, Soda Ash, from which the State and the Country suffer. The State Government must now obtain the necessary approvals for the project to enable SPIC to select the production process as between the available Indian, Japanese, Polish and Rumanian know-how and so ensure that the plant goes on steam in January 1976.

These and other industrial development activities involve some dislocation to the lessees of the salt lands in the area. Tuticorin is a major salt producer. Most of that land is being acquired by the State Government for industrial development. It is important that alternative lands for salt manufacture which is a major activity in this area with high employment potential be made available to the industry without loss of time.

In the Manali comlex, Nagpal-Ambadi went into production in September as the leading manufacturer of special petroleum products in the country. This Rs. 5 crore plant is producing annually 15,000 tonnes of transformer oil for the electrical industry and 8,000 tonnes of special oils for the pharmaceutical and plastics industry. With this initiative, imports from the United States which had been the major source for these oils at a cost of Rs 4 crores will be replaced. In this vital growth area, the marketing of the product as in the case of fertilizers is an important issue

for which the industry itself should be mainly responsible. The present divided arrangement for marketing the product on a 50 : 50 basis as between the plant and IOC should be reviewed in the light of considerations of economy and efficiency.

Another plant which has got over its teething troubles and started production in October is the Arkonam Continuous Steel Casting Plant. The plant is now producing at the rate of 50,000 tonnes of steel billets every year and will in two years expand to an annual production of 1,00,000 tonnes. It turns iron scrap into steel, using the new transforming techniques. Another industry which needs some stimulus is coir. It is important both as a source of employment and as a foreign exchange earner. Some 100 thousand hectares in the State produce 900 million coconuts annually. Recently due to increased use of coir for fuel purposes, there has been some decline in both production and export earnings. The State Government plan to provide Rs 70,000/- to every enterprise starting mechanised units for extraction of fibres and a central co-operative coir marketing society in order to help the mills market their product and educate consumers will help the revival of this activity. More generally there is need for district level industrial co-operatives which can specialise in providing finance, raw materials and marketing services for a number of small industrial activities like coir. In the case of silk which is also an important export item to new markets in U.S., Canada, France, Switzerland, Italy and Japan, it is important that quality and costs be maintained at competitive levels. Here a co-operative or All-India Bank, with branches in producing States, can help build up stocks, subsidise exports, streamline procedures and safeguard quality. Oil prospectives in the Cauvery basin is beginning to yield positive results. Ten high yielding wells which are planned would meet the growing oil demands of the State and the South. Given the promising geological structure of the region, this important activity should be pushed forward quickly.

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**Industrial Relations.**

The posture of industrial relations in the State is not satisfactory. In 1969 there were 174 strikes and lock-outs and

6,83,059 man-days lost. In 1970 there were 277 strikes and lockouts and over one million man-days lost. For the country as a whole 19 million man-days were lost through disturbed industrial relations. Tamil Nadu's share of this troubled situation was 1/19—which is much too high for a State which is moving up from the 3rd to the 2nd place in the industrial hierarchy of the country. The prospects continue to be unsatisfactory in the current year. Bonus payments arrangements have become recently a cause for production stoppages. Demanding a higher minimum bonus of $8\frac{1}{3}$ per cent, workers have staged a stay in strike in about 50 textile mills in Coimbatore. In turn 26 of the mills have declared a lay-off. The agreement between the mill-owners and four of the Unions has not helped in ending strikes and closures organised by other Unions. Similar strikes and shut-downs are under-way in October in Addison, Simpson, B & C Mills, and Ennore Thermal Plant. The strikes by junior engineers and intermediate technical staff of the Neyveli Corporation led to the shut down of the thermal station and an industrial accident. This strike had multiplier effects in slowing or closing industrial plants and reducing home consumption in Neyveli and Madras. The fertilizer and the briquetting plants of the Neyveli Lignite Corporation were shut down. The Madras Rubber Factory has had a prolonged period of labour unrest, and the plant close-down which has now ended, will require some months before capacity production is resumed. A similar prolonged dispute has been a recurrent factor in the Madras Harbour and Port Trust. Again, but for the quick and decisive intervention by the Chief Minister and the Minister of Electricity, there would have been a similar prolonged period of stoppage in the State Electricity Board. Industrial relations pose a number of complex issues. Industrial peace is needed by the State in view of the high industrial and welfare stakes involved. The peace must be just to the workers and necessary to the managers. There is a strong case for leaving the two parties to negotiate the settlement of every dispute without intervention by the Government. Equally, there is a very definite limit upto which the public can be asked to be patient or the State investment jeopardised. At this point State intervention is called for. Such intervention has been needed and successful in this State as in the case of Coimbatore and the State Electricity Board problems. Where such intevention is called

for it should be that of the State Government and not of the Central Government.

Here again, the larger question of Centre-State spheres of action arises. Both in the area of the settlement of labour disputes and in that of licensing industrial development policies, procedures and regulations, a point has been reached where there should be agreed decentralisation and devolution to the State. The number of disputes which are hanging fire and the number of licences which are still under study by the Centre are such that even elementary principles of sound administration —without any reference to the higher principles of Centre-State relation—require a further devolution of responsibility for arbitration, appraisal and approval procedures to the level which has operational responsibilities—the State.

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**Agricultural Development**

Rice production in the State for the current year will reach the record output of 49 lakh tonnes and foodgrain production will increase from 63 lakh tonnes last year to 69 lakh tonnes this year. This is the reason for the announcement by the Chief Minister abolishing as of October 5 the 25 per cent levy on paddy movement from Thanjavur District and removing restrictions on the movement of grains within and outside all districts. These controls which have been in operation for four years have no longer any reason to continue, with the State emerging as a food surplus area. It is expected that 3 lakh tonnes of foodgrains will be available as exports to other States. Tamil Nadu thus becomes a surplus State in food and cash crops like its neighbour, Andhra Pradesh. This result is based on a sound agricultural policy relating to water, fertilizers and other inputs together with high-yielding varieties tailored to the different soil and climatic conditions of each district. With the same land area as Gujarat, the State produces double the Gujarat yield.

The major constraint in agricultural production in the State and the country is drought. In the midst of our bumper harvests and enthusiasm over the Green Revolution, it is well that the

Agricultural Prices Commission reminds us that our increased food and cash crop production has occurred because of four years of continuous and generous monsoons, and not because of the new agricultural technology. It points to the fact that the major part of the production increase came from areas not under IADP: that 40 lakh tonnes out of 83 lakh tonnes increase last year came from Rajasthan which is entirely a dry area. It is against this background that the State programme for completing rural electrification by the end of next year, 1972 becomes significant. It is not simply that this makes Tamil Nadu the second State to have the entire State electrified, the other being Haryana. It is part of the basic and esential development strategy for providing the agricultural base for rural well-being and growing industrialisation. Out of 57,000 villages in our State, 44,645 have been electrified and the remaining 12,000 and odd will be in the next 13 months. It is on this basis that the traditional dependence of the State's agricultural food production on rains is being replaced by the ground-water development programme. Fourteen thousand new irrigation wells have been sunk against the target of two thousand. With the help of the Agricultural Refinance Corporation, the State Agro-Industries Corporation is expanding its well sinking programmes, particularly in Thanjavur and Tiruchirapalli districts, to promote greater multiple cropping. So far 5.5 lakh wells, representing over one-third of all wells of the country have been energised. They irrigate 16 lakh acres covering 7·2 lakh farmers today. Every year 60,000 pump-sets are being energised. The result is that rice production is no longer a monopoly of Thanjavur, Madurai and South Arcot, but is spread all over the State.

This sound agricultural development strategy needs to be under pinned at some important points. Power generation has become crucial for agriculture and industry in the State. At the moment industrial plants are paying a heavy price subsidising the power needs of agriculture. Further the State power deficit which is now 240 MW will become 630 MW at the end of the Fourth Plan and might double again by the end of the Fifth Plan. For the moment the State depends on the surplus power of Kerala and Mysore which will soon cease to be surplus States. Hence the long range planning of power schemes—Kalpakkam, Ennore, Kundla, Tuticorin and the second

mine-cut at Neyveli—needs to be pushed forward. Parallelly, there is need for revision and reform of the power tariff for industrial, agricultural and home consumption, taking into account the analysis and recommendations on the subject made by the Natarajan Committee. It is urgent that the electricity investment in the State should be expanding and for this it should cease to run at a loss. The power programme should become economically, technically and financially viable.

The other problems are to do with the small farmer who constitutes over 60 per cent of farming households in the State according to the 16th round of the National Sample Survey. For them there is the problem of cost and marketing. The new technology has increased the cost of cultivation from Rs. 300 per acre to Rs. 1,000/- per acre. But the yield has increased even faster from 10 bags per acre to 30 bags per acre. Turning this increased production into cash however depends on markets. The marketing bottleneck even in a district like Thanjavur arises from the fact that marketing co-operatives having lost financially are fading from the picture, the Food Corporation of India has been lagging and selective in its purchases and the buying merchants have been handicapped by Reserve Bank Credit controls. Hence distress sales are on the increase. In this context, it is urgent that the Small Farmers Development Agency should be activated immediately in order that it may step in and concentrate on developing markets. Finally, it is also essential that the structural problems of assigning farm labour, the lands on which their dwellings had been built, the limits on grain hoarding, by large farmers and the construction of link roads in these areas be attended to in order to consolidate the gains from the agricultural leap forward in the State.

Another area calling for early action in the State is in the development of storage facilities. With the emergence of the agricultural surplus, the storage capacity in the State must be expanded. For the country the storage capacity has to double from 5 to 10 million tonnes. In the State standard rice godowns, using star bin models, and post harvest storage facilities at farms and co-operatives must be put into effect rapidly. Such storage space by cotton and sugar mills is needed. From the qualitative

point of view some re-orientation of rice mills in order to increase the quantity and improve the quality of processed rice is necessary. The Thiruvarur Modern Rice Mill's new methods of paddy preservation and de-watering along with husk fired heat exchanges demonstrates a one-third reduction in drying costs. This is based on the par-boiling principle that the salt rinsing of soaked paddy reduces extra moisture and drying time by 50 per cent. If the mills are modernised it will be possible by adjusting the soaking conditions to increase the yield from the rice bran by two lakh tonnes oils and 15 lakh tonnes bran meal for cattle.

The State farm in Chengam, the eleventh in the country is the first giant agricultural complex in the State now in operation. Reference was made to its preparatory phase in the last Issue (No. 9) of the Bulletin. The farm covers 11,000 acres including some parts of Anandavadi Reserve Forest area. Starting with 1,000 acres, the entire area will be cultivated by 1974. The State Farm's land development programme should help the growth of co-operative farming and small and marginal farmers. Its agro-based industries will help farmers in the use and maintenance of farm machinery and implements. The effectiveness of this programme of help to the small farmer would be furthered by bringing into early operation the Small Farmer's Development Agency referred to earlier. There should be close co-ordination between the work of the Chengam farm and that for high yield seeds promotion. The latter must take into account the different water, climate and soil conditions in the State as well as the grain quality. The six new rice strains released by the Cuttack Institute in September should be tried out at Chengam in relation to the environmental conditions in the State. These varieties are claimed to yield an average annual profit to the farmer of Rs. 5000/- to Rs. 10.000/- and these claims can be tested at Chengam. The production of foundation seeds for maize, Cholum, Cumbu and cotton can also be strengthened at Chengam.

The State faces a great increase in the use of pesticides. When an intensive pesticide is applied in IR-8 areas, rice production increases by an amazing 729 per cent. When Taiching Native-I is used, pest control produces a one thousand per cent increase. So too cotton and millets respond quickly in terms of increased

yields to pest control. Thus pest control is a key element in our agricultural strategy in the State. There are however dangers of new and increased pests such as the leaf hopper in paddy farms and the effects of over-dosage of pesticide on human and animal health. The State must launch a programme of intensified research in the use and after effects of pesticide which can then help in evolving a policy of directed integrated control with regard to pesticides while we still have the time for it in this State.

Reference has been made in an earlier issue (Vol. I, No. 8) to the need for a master plan for the development of fisheries in the State with its long coast line. Such a programme must be a package and crash programme involving the development of harbours, diesel engine factories, net making units, modernisation of fish processing, expansion of cold storage and refrigeration facilities and mechanisation of sea-fishing-vessels. Pending the establishment of such a plan with the help of the State Planning Commission's task force on fisheries, the mechanisation part of the programme is forging ahead. Some Rs. 20 lakhs have been made available by the State, the Agricultural Refinance Corporation, the Agricultural Finance Corporation and the Commercial Banks for the purchase of 50 mechanised boats to a group of private entrepreneurs. This part of the programme must be rapidly co-ordinated with the inter-related parts of training, storage and distribution.

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**Education and Science.**

The Tamil Nadu Agricultural University in Coimbatore was formally inaugurated in September. It fills a long felt and serious void in the State educational and development system. The University will be responsible for training the agricultural man-power to implement the agricultural strategy of the State and the Fourth Plan programmes which are of the following order :

| | (Rupees in Crores) |
|---|---|
| Agricultural production : | 37.0 |
| Irrigation | 64.0 |
| Soil Conservation | 7.5 |
| Animal Husbandry | 8.0 |
| Dairying | 5.0 |
| Forestry | 4.7 |
| Fisheries | 13.8 |
| Co-operation and Community Development | 45.0 |

It will train specialists in plant science, soil science, horticulture, agricultural economics, social sciences, forestry, fisheries, agricultural engineering, animal sciences, co-operation and food technology. Its research and extension programmes will now be decisive for the State's agricultural development and should be co-ordinated with the research programme of the Agricultural Department. The University's present operations in Coimbatore and Madurai must be extended to cover all the sciences referred to above and the various institutions engaged and this area in the State.

Another project under consideration is to develop the engineering colleges including the Regional Engineering College at Tiruchirapalli into a Technical University in the State. Such a development follows the specialisation trend in most industrially advanced countries. Actually the Indian Institute of Technology in Guindy is an Engineering and Technological University of international standing. It is not a State but a Central Institution and in the creation of a State Technical University, the problems involved must be borne in mind. No country, not even the richest, can afford two quality engineering institutions in one City. The proposed State University should not be a lower class institution. Further if technical education is separated off from general university education, the inter-action between the two systems must be ensured by specific provisions in order to promote students and staff mobility and not to arrest the development of inter-disciplinary programmes and research.

Medical education standards and admission to medical Colleges in the State have been the subject of expert study and wide public discussion. The expert study headed by Dr. Natarajan has

found a decline in the quality of medical education which the Committee remarks is rather disturbing to the enviable reputation the State has built up in the past. But the problem is more serious. The State cannot afford to have second class doctors. The people's health and children's safety demand the best of medical services. Second there is colossal wastage in our medical education. The Committee points out that not more than 50 per cent of the students get through the examination and not more than 16 per cent complete the M.B. Course in the stipulated 6½ years. There is over-crowding and lowering of standards. Pending the opening of new colleges, the Committee recommends an immediate reduction of admissions from 800 to 600 in the four over-crowded colleges, Madras Medical, Stanley, Madurai and Thanjavur. The Government however, has reduced admissions by 110. This situation is regrettable. The State needs more doctors, many more, to reach a tolerable doctor/population ratio of 1 : 2,000 particularly in the ill-served and neglected countryside. The opening of more quality medical institutions is a first educational priority for the State.

With regard to provision of medical services to the neglected country-side, the important experiment of the Voluntary Health Centre and the mini-health centres established by it in the rural areas around Madras should be rapidly extended throughout the State. This scheme rests on two well tested principles. The first is to provide complete medical coverage for all the members of each family, using existing hospital facilities which are usually located in urban centres. The Service maintains an up-to-date and complete medical history of each of its members on the basis of diagnosis carried out at mini centres. The second principle is a graduated scale of contribution by each family belonging to the Service. For families earning below Rs. 400/- a month, the contribution is ½ per cent of the monthly income. For the others, it is the full cost of the medical services rendered. The Service now has three mini health centres in the St. Thomas Mount Block. Each centre has a doctor from the locality serving at the Centre for three hours daily assisted by para-medical personnel. The Service is in its early stages. Its actuarial valuation for those families above the Rs 400/- (income) bracket, needs to be worked out. So too should the expansion of the mini-centres throughout the State.

The Voluntary Health Service may also have relevance to the curious under-current in the medical field in the reported unemployment of doctors, an unemployment related to the present urban/governmental occupation concentration. Apart from the Voluntary Health Service which might help to spread and bring into the open the demand for doctors, it is good that with the help of the UGC, 80 colleges in the country will be running Career Advisory Units. The units will disseminate occupation and employment market information and help recruit eligible candidates for vacancies. For this, the University Bureau of Employment Information needs to be strengthened in order to become a real focal point between the college units, the State Employment Directorate and the Employment Market.

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**Preparatory Meeting on the Second Workshop on Economic Research Methodolgy.**

A two-day seminar consisting of the heads of departments of Economics of the 14 Universities from the four Southern States will be held in the Madras Institute of Development Studies, in co-operation with the Indian Council of Social Science Research, on Friday, the 10th and Saturday, the 11th December. The Seminar will deal with three subjects :

(a) Programme and arrangements for the second workshop on Economics Research Methodology to be held in the Kerala University during May-June 1972, for six weeks for 35 Ph.D. Economics Scholars from the Southern Universities.

(b) Problems and perspectives of Economics Research and Methodology in the Southern Universities.

(c) Project for an Economics Text-Book for undergraduate Economics Students.

**The Heads of Departments of Economics will be attending from the following Universities:**

| | |
|---|---|
| Andhra Pradesh: | Andhra, Osmania and Sri Venkateswara Universities. |
| Kerala State: | Calicut, Cochin and Kerala Universities. |
| Mysore State: | Bangalore, Karnatak and Mysore Universities. |
| Tamil Nadu: | Agricultural, Annamalai, Madras, Madurai Universities and the Indian Institute of Technology. |

The Director of the first workshop will also be attending the Seminar.

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**Study of the Education of Scheduled Castes and Tribes.**

In accordance with the programme proposed by the Union Minister of Education and approved by Parliament this summer, the Indian Council of Social Science Research is organising an 18 months' study of the Education of Scheduled Castes and Tribes with a view to expanding and improving their educational facilities and fulfilling the constitutional pledges to this discriminated sector of our society. They form 20 per cent of the population. For the purpose of this study, for the Scheduled Tribes, five States—Assam, and Meghalaya, Bihar, Gujarat, Madhya Pradesh and Orissa and for the Scheduled Castes six States—Andhra Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, West Bengal and Tamil Nadu have been selected. Project directors from the eleven States met in October at the Tata Institute of Social Sciences, Bombay and agreed upon the major areas of study which include:

(a) the access performance of Scheduled Castes/Tribes students at the various levels of education, pre-primary, primary, secondary, professional and university;

(b) the adequacy and the functioning of the hostel facilities for them, and

(c) The nature and sufficiency of their scholarships.

In December there will be a further meeting of project directors to establish the outlines of the study, the questionnaire to be used and the methodology to be followed in compiling the State Reports. For Tamil Nadu, the Madras Institute of Development Studies has agreed to accept responsibility for undertaking the study. Tamil Nadu has a good record in the enrolment of Scheduled Caste students in pre-primary, primary, secondary and higher education institutions, being the second or the third among the major States, having nearly attained and in some cases surpassed the co-efficient of equality for this group vis-a-vis other groups in its population. The problem in this State seems to be to further improve and expand the quality of education and educational attention provided to its scheduled caste students. This programme is one means for the State and country to break down its poverty problem and deal with it in a manageable and controlled manner. It could then be extended in stages to all the backward communities in the State. The State is moving in this direction as is seen in the recent extension by the government of the list of backward communities.

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**Seminar on Consumer/User Oriented Research.**

As indicated in the last issue (No. 9) of the Bulletin, a summary of the statements, discussions and decision of the Seminar on Consumer/User Oriented Research appears as the third article in this issue. The papers submitted to the Seminar will appear in the Special December issue of the Bulletin, together with an indication of follow-up action on the decisions of the Seminar.

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**October Madras Development Seminar.**

The October Seminar paper. "Teaching of Science in Schools and the Need for a Dynamic Curriculum" by Dr. T. S. Sadasivan, Director, Centre of Advanced Studies in Botany, together with a summary of the discussion of the paper in the Seminar appears as the first article in this issue.

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**The Second Article.**

An article on "Banks as Instruments for Promoting Growths with Stability and Social Justice" appears as the Second Article in this issue.

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**Correspondence.**

A comment on Dr. Kurien's paper on the "Problem of Suburbanisation" appears in the Correspondence Section.

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# TEACHING OF SCIENCE AND THE NEED FOR A DYNAMIC CURRICULUM

By

PROF. T. S. SADASIVAN

*Director, Centre for Advanced Studies in Botany, Madras.*

**Introduction :**

One of the vital national problems, of considerable significance, that has continuously received serious thought, from those engaged in academic endeavours of teaching and research, is the need for a re-orientation of the pattern of science education in this country. It is hardly necessary to reiterate the need for education, good education and university education as a basic obligation that has to be met by society as a whole. The Education Commission in India, as early as in 1966, has emphasized that our country is in transition from a society, in which education is the privilege of a small minority to one in which it could be made available to the masses of the people.

Science is a basic component of education and culture. In modern societies the use of science-based technology helps modernization of agriculture, industry and other economic activities of life. A close inter-relation of science and technology, is now a typical component of the new world which has raised the gross national product of many nations. We, in our country, are still in the initial process of development and the role of science is perhaps of the utmost importance to us. There is no gainsaying the fact that science education has become an integral part of education and ultimately a study of science in some way or the other becomes a part of all courses on Humanities and Social Science, both at the very high and low levels of education. For instance, twenty years ago Economics was a descriptive subject but today it has as much mathematics and computer technology built-in as, say, Biology. This back ground was taken cognizance of by the Education Commission in their assessment of the national problems of education.

The phenomenal development of science and the transformation it has brought about is an important feature of our times. Few of us, however, appreciated fully all the far-reaching implication of scientific discoveries. This lack of appreciation is not always due to ignorance but deep seated prejudices. There is a wide spread belief that science, religion and politics are best kept apart and should not be allowed to encroach upon one another. The biological sciences in particular, concerned as these are with problems like the origin of life and its development through the ages, obviously provide us with information which is of great significance in relation to some of these questions.

**Why teach Biology as a part of Science ?**

It has often been said, that in comparison to the precision and specificity of achievements in the area of physical sciences, development of teaching and learning biological sciences has been one of vague generalizations and broad descriptions. Whatever it be, it is perhaps to the advantage of the biological sciences, that in spite of the lack of general laws and the precision of physical sciences, it could still emphasize the fact that there is a natural unity which makes life possible. However, the ultimate balance between diversity and unity, that sustains the prime phenomena of motivation of life processes, has seldom been taken cognizance of, in an effort to understand the basic philosophy of science and the role of Biology in such a process.

Even historically, every human effort in every other sphere has been based on an appreciation of nature. Most human achievements in biology up to the development of antibiotics has been used essentially for human welfare and are all directed and influenced by nature itself. In a society like ours, nearly 80% of the population is sustained essentially by the one vital industry in India, agriculture, which in its turn is closely inter-linked to the problems of nature and her bounties. Added to this are the many sided problems of social development which are ultimately based on the needs of vast human population and society of our country. Even erringly, the very concepts of social justice like the struggle for existence and the survival of the fittest have their origin from the early development of biological thoughts on Evolution, as put forth by Darwin and his predecessors.

In this particular stage of development of education, in this State in particular and the country as a whole, it is, indeed, difficult for a person keen-on both quality and content, to reconcile himself to the well meaning, yet large scale expansion of educational facilities taking place all over and the cry for maintenance of standards and quality of education at the same time. In spite of being grossly misunderstood, at least men of academic affairs, should realise that mass education can ill, if ever, go hand in hand with good education. It is needless for me to stress or invite your attention to the various aspects of the problems confronting education in our State and in our country, as they have been well touched upon by Prof. Hegde and Thiru Chittibabu in previous meetings and by Dr. Adiseshiah himself. I, therefore, begin by resorting to a quotation from Dr. Adiseshiah :

> " Our curricula at present does not educate, our examination system does not test learning ability or achievements and our educational management system is out-dated and lost in the current of educational explosion. "

There is also the problem of combination, balance, juxtaposition and relevance, of what is to be taught and learnt, and the relations and bearing of such processes to the surrounding society. Our curricula, at almost all levels, has many shortcomings from this view point. Compared to the vast social, economic and political changes taking place so rapidly in our land, the pace of educational development and programmes, and particularly the detailed development of the individual components that go to make up the core content of instruction at any level, is very, very slow indeed.

**The teaching of Science in our schools today.**

A review undertaken by a small band of my colleagues who are actively engaged in the task of evolving a new biology curriculum for use in all schools in India, revealed two prime factors which are interesting. They are:

(i) that all the curricula so far reviewed by us have little or no relevance to the present day needs ; and

(ii) the curricula analysed, reveal no specific objectives.

Under such conditions, it is very difficult to initiate a programme or develop a logical perspective in culmination of our plans. Yet, taking into account the urgent and dire need to postulate well defined plans for science education, the responsibility of men in the academic world in this regard cannot be brushed aside.

In historical perspective one can easily summarise the present day science curricula, as a mere reproduction of a vast assemblage of scientific principles and data set in some structured pattern and tailored to suit local needs. As a consequence, we have placed far greater reliance on facts compiled in foreign countries and accepted their usage as such, as transplants. Today, the impartation of science, in all teaching situations, has become a didactic system of several *obiter dicta* passing by word of mouth to generation of students. This is perhaps pardonable in music but even here one of the major criticisms of Indian Music by Western Scholars is that we have no notations and we have not quantified this pleasurable art. Further, the practical instruction in science has been merely to observe what one has already been conditioned or taught to observe and verify again already established constants or data. The grave consequence of such a process of education has been the stultification of the brilliant intellects of a vast majority of the youth, most of whom would have been easily available otherwise, to enrich the scientific scene of our land.

The identification and development of talent at an early stage, constitutes one aspect of the full exploitation of our available brain power. A closely related aspect, and one which has an important bearing on our social organization, is the question of maximum utilization of this most important of our human resources. Genetical considerations are of relevance in this context. Not only is it recognized that the general level of intelligence as a genetic component, there is also evidence that different genes may be involved in determining different kinds of talent and aptitude, and that in general, a person may be expected to do considerably better at one thing than at another. There may be a Leonardo de Vinci here and there who can excel at many things, but more commonly a person is not expected to show a high rate of adaptability in taking to jobs requiring different kinds of abilities such as in mathematics, architecture, literature and other basic sciences.

Our present system of recruitment to and the types of rewards offered in the administrative and other services need some consideration on this basis. It is not suggested that a student of science cannot make a good administrator. Indeed, administrative jobs relating to scientific and technical organizations are better handled by persons who have had science training. It is important, however, that a student having real aptitude for scientific research and other specialized jobs is not obliged to take up a civil service career simply because of the higher emoluments and better conditions of service which be can secure in this way. An underdeveloped country like India needs good scientists as much as good administrators, and those who have the capacity to make good scientists should not be lost to science. This appears to happen not infrequently. In India we have a unique problem of brain drain, far more serious than what we usually talk about. The extremely difficult condition imposed on our exceptionally gifted children in dubious environment, such as obtaining in our rural area, result in a greater loss of the country's intellectual resources than migration of our scientists. Out of an estimated 170 million children in India under 11 years of age, not even 50% of them ever obtain an environment required for the flowering of their intellectual potential.

Educational and scientific techniques as now available, with suitable modifications, should be used to screen children under 11 years of age (a practice almost common in the U.K.) to identify those fit for higher and specialized education. This could easily provide us with quite a few thousands of potential scientists. The State should undertake to provide a better environment in terms of nutrition, education and care for these gifted children. The cost in this regard should not be a consideration. What is needed, is a proper objective machinery to work such a process and ensure a return of everlasting value from such an investment.

I can perhaps speak of Biology in a more direct and forthright manner because of my personal and fairly long association with this subject. I have felt that the teaching and learning of Biology has to a large extent been a very soft option involving the cramming of a few generalized facts with little or no effort to arrive at well thought out conclusion. Yet, as nothing can per-

haps develop from a vacuum, one is perforce compelled into a situation of having to retrieve the basic wherewithals from the morass of needless effluents and proceed carefully into a deeper process of laying out a strategy for the future in evolving a dynamic curriculum to utilize science teaching.

People and population are not the same. We are living, in fact, through a revolution, internal and external, scientific and social. Many of our troubles have implications for teaching in general and for biology teaching in particular. These problems can be generally referred to as the set of P's; population, pollution, pesticides, poverty, pestilence, pornography, power and politics and yet one more, pedagogy. If we believe that we have taken the first step in recognizing the role that teaching can and must play in this situation and in the connected scientific social problems that confront us today, then we have set our sights properly.

Many people still blame science and technology for most of our troubles. It is probably men who should be blamed for the uncritical use of technology and science. This today implies, that in teaching science we should include considerations of possible consequences of man's uncritical use of science and technology; in this process it must also be ensured that the differences between science and technology and also the proper and improper uses of the product of technology are clearly taught. We, therefore, primarily need experts to communicate and teach. In this sphere, a biology teacher needs a clear understanding of the total picture. Science is always a relevant and an important part of society.

**The cry for relevance and the present needs :**

As teachers we always hear the cry for relevance and ask ourselves, as our pupils no doubt will ask us; so what ? -Does what we teach make sense ? Does it make sense now and here ? Is it relevant ?

Several years ago I had to say on the same problem of teaching of biology in our schools that nothing short of a revolution in the methods of teaching science at all levels, can bring about any perceptible changes in attitude in our land.

**The way out of the problem:**

A brand-new syllabus followed by an uptodate science curriculum and science kits, text books and teachers' guides for every stage of school and collegiate education is not all that we need. We urgently want, in addition, an effective delivery system. Indeed, we have to expose our teachers to ultra modern pedagogy through various processes of inservice training as expeditiously as we can to ensure an effective delivery channel. With the large number of Summer Institutes in Biological Sciences in the last seven years we have only touched the fringe of the problem and hardly 5 per cent of our schools and college teachers in the country have been exposed to them. The impact of physical sciences on biological problems and the application of mathematics and biometrical processes in understanding biological norms has to be clearly brought out. In fact, the many outstanding discoveries in the biological field in the last two decades have been in borderline areas where leaders in the field of physics or chemistry have jointly effected breakthrough into the mysteries of nature. Thus, ultra-microscopic studies into cell structures with the electron microscope, study of structures of matter at molecular level with x-ray, the many problems of radiation biology, the immeasurable strength of mutagenic rays in causing genetic changes, the working out of the structure of the ultimate carriers of heredity, the use of radio-active isotopes as detection tools in the hands of the biologist, the discovery of antibiotics and the development of chemicals that inhibit abnormal growth and proliferation noticed in carcinogenic materials are but a few of the great achievements within the short span of the past three decades.

Wartime research under stress has yielded much in these fields but the moral of it all, is the closely knit pattern of education that might be called a broadbased introduction to scientific thinking and the basic training in more than one discipline at the lower secondary and higher secondary schools through to graduation, that was at the root of these epoch-making discoveries. Chance, world shaking discoveries are the outcome of a man of genius; but the bulk of these emanate from planned scientific experimentation by a large team of scientists who have the background knowledge of more than one science discipline. For instance, forty years and more have elapsed since the discovery of the remarkable protein,

insulin and it has fallen to the lot of a team of over 20 Chinese scientists working *in Peking to claim in 1966 the synthesis* of this molecule in the laboratory. It is this kind of tenacity and fixity of purpose in scientific work that yields high dividends in team work and quite obviously this spirit has to be inculcated right from the beginning. Nevertheless, creativity of the individual should not be sacrificed in any attempted regimentation of scientific teaching and/or research. It must be remembered that many of the remarkable fundamental discoveries of the nineteenth and twentieth centuries, in basic or applied sciences, have been, and will continue to be in the future, the result of creativity of individual minds. Indeed, this is true in all vistas of human endeavour, music, art, religion and as now in science.

**Our Legacy.**

While the tempo of collegiate education in all the major cities and university towns were kept at a reasonably good level, during the past 50 years, school education. particularly in the sciences, was as low as could be, particularly in the rural areas. Despite this, many good Indian Scientists enjoyed international recognition for their researches, particularly in the fundamental sciences—a tribute to their sagacity and diligence more than the basic knowledge they acquired from their schools. Some at least, of this privileged few had an opportunity of working with *distinguished men of science, mostly* in the United Kingdom before Indian independence, and now in an unending stream in the United States of America in the post-independent period. In many cases, especially in theoretical subjects, the lacuna of knowledge in the early impressionable school years became apparent as not all could hold their own in the highly competitive atmosphere of western universities. Against this background of the free-independent status of science teaching in the schools and universities in the country we would do well to examine what new thinking has gone into the teaching of science in our schools since 1947.

Quite frankly, much of the earlier acquired, immunity and a certain conservatism, born out of lack of knowledge of what was happening in the rest of the world, have lulled our school adminis-

trations into a state of complacency and what they were battling with was the shadow and not the substance. For instance, most people are concerned with the urgency or otherwise of bringing in reforms such as imparting science education in the regional languages, the preparation of text books in somewhat the same pattern as before, the retention of the old system of examinations which depended more on rote than understanding the fundamental principle of a phenomenon In other words, the science laboratories remained where they were, the quanta of new knowledge in an otherwise outmoded syllabus remained static, teaching aids, models and newer teaching materials were hardly introduced. Those that were introduced had neither meaning nor purpose. All this when the rest of the advanced countries were showing a new dynamism in the sphere of teaching science in schools.

**The Future Hope**

I have, I am afraid, been frank and hypercritical of some of the teaching programmes; but I have only been eager to run this race against time in which our national interests are of paramount importance. I do also have a few fresh themes as a solution to our problems.

In the teaching of science, all of us as teachers must continue to learn and be willing to become more flexible. We must be willing also to add to our knowledge and what is more necessary, learn more science, learn more science processes and see a deeper understanding of relationships between science and society. These needs can be met by science teachers only with help from specialists in all allied fields including social sciences. The economist has as much a vital role in this process as the scientist, because much of the reforms needed for a dynamic re-orientation of science teaching will call for more effort and more money from society. These developments call for a team approach. It will mean recognition of contributions from other disciplines as also the demolition of some of the needless barriers between our teaching disciplines.

I am inclined to recall a set of objectives set forth elsewhere to identify trend-setting developments for 1970's. They included:

(a) Improvements to increase human brain activity to speed up learning processes and memory.

(b) Improvements in weather forecasting and weather modification to reduce losses due to natural phenomena.

(c) Expansion of the uses of natural resources on land and the oceans.

(d) Improved developments in communications which might result in shifting the education processes outside the traditional schools and colleges.

(e) Development of suitable audio-visual aids for self-education.

It is strange that thoughts and aspirations in nations geographically separated still retain some common demoninators of aspirations. I would, therefore, feel that the future trends to utilize science teaching in this country will call for :

(i) an emphasis on the teaching of biology reflecting on the problems of biology and society. This is not out of place, if we take the trends already afoot all over the world to link biological problems as the basic framework of social development. In the past twenty years, biology curricula have become both content and process centred. We have to move from content and process, in the areas of problems which will necessitate an integrated plan of teaching. Biology which for many years has been a package has now unravelled itself into as precise a science as any other. This will in turn lead on to student involvement and interactions between students and students and students and teachers.

(ii) The teaching of biology to be integrated in such a way as to involve a learning of related diciplines of science as also to lead to an understanding of the problems of society based on the knowledge of biology and science as a whole.

(iii) The process of curriculum development to be a continuous, self generating, self evaluating process.

(iv) New processes of teaching and learning to create motivation in which students will become prone to learn by a process of self discrimination and the teacher has a clear managerial role.

(v) Evolving of meaningful kits for demonstrating basic biological phenomena at all levels of school education.

(vi) Individual instruction, though may be a far cry, to become the ultimate objective.

We should, however, remember that while refocussing and reorganizing the pattern of science education in the country, we have no need to do away with the knowledge and techniques of the sciences that we already have, unless replaced by new knowledge or better techniques. We should recognize not only the needs of the teachers and students but also the aspirations of society so as to make the maximum contribution to scientific literacy and social responsibility.

No process of curriculum reform can be pushed through with any measure of success if the teachers concerned with the daily load of teaching are not provided with adequate and well-set opportunities for inservice training. I have been making repeated and sustained efforts to focus the attention of every single agency and authority connected with educational development, to provide such a facility in a multi-storeyed structure catering to all sciences and with an uptodate science library, museum, workshop etc. These institutes must be run by a Consortium of Scientists consisting of university, college and school science teachers and they must be an autonomous democratic body electing their Chairman. This institution could serve for all the year round inservice training wherein teachers could attend any time and get to know current trends in teaching in all disciplines. This centre can also take up question of designing and fabrication of simple kits and apparatus and even produce prototypes which can then go into mass production. Also specimen collection centres (Biological Supply Houses) to serve as national sources for the availability of valuable experimental biological material are a must and this can be done in the public sector on a non-profit basis under the expert advice of specialists around these permanent science institutes. Last but not least, at the administrative echelons, when there are separate directorates for agricultural, veterinary, medical and technical education the need for an authority well in power at least within the frame work of the educational administration of the day, to deal with science

education and reforms in science education and curricula is a need of the hour. A dean of research and academic studies in the Universities and a separate Directorate for science education at the school level, headed and manned by competent scientists rather than mere education administrators, is not an over ambitious claim at all.

**Conclusion :**

In parting, I cannot resist a reference to the immediate needs of the society vis-a-vis the educated population. Unless we devise a course of science teaching commensurate with our social needs and if society fails to utilize a large generation of well trained youth for increasing our vast potential of agriculture, industry etc. the consequence of repercussions, will be far and wide spread. I, for one, cannot envisage a core of science curriculum, at any stage of completion of education, which the youth of this country cannot utilize in the improvement of agriculture or industry in their own way, in some small measure within the confines of their environment, and thereby generate a new perspective of self employment and self sufficiency, to improve the economic and social conditions of our country.

For instance, agrochemicals and their role in modern agriculture or the production of high viability hybrid seeds and understanding the principles and practice of plant protection by chemicals are as important to our rural areas as they are to the growth of research and development in quality seed availability and in the agrochemical industry.

The vast educational explosion in our country cannot be solved by the opening of more institutions of learning. Unless society is geared to think in terms of creation of opportunities for self education and self learning through a process of continuing education, we may not advance very far. One is inclined to bring to attention the latest British effort at the open University in Walton, where education of university and professional standards is provided using a variety of media and self instructional kits, all

supported by well devised TV/radio programme of instruction. This should indeed be an eye opener to us.

Finally, in so far as better science education is for the benefit of the society as a whole, society should also care properly for its educated youth and teachers. I hope that this country with so many achievements to her credit will not fail in this venture.

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# APPENDIX

**Some particulars about self instructional programme in the Open University in the U. K.**

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THE OPEN UNIVERSITY

The Open University
Walton Hall, Walton
Bletchley, Buckinghamshire

Our Ref. JC/AR

*Dear Professor,*

The Open University commenced operations in January 1971 to provide education of university and professional standards by utilizing a variety of media, including specially written textbooks, and a series of radio and television programmes, and Home Experiment Kits, etc.

The texts consist of carefully structured educational material presented as well-designed, fully illustrated books. They are fully supported by radio and television; each medium is used for the distinctive contribution it can make to all Open University courses.

The Open University has made all this material generally available for sale. The textbooks, radio tapes and films of television programmes are offered as single units, in groups of units or as complete sets.

**Science Foundation Course**

This course presents and explains some of the principles of the importance in modern science and how Science, Technology and Society are inter-related. In particular, the subjects of Physics, Chemistry, Biology and Geology are discussed in such a way as to show how these titles are related to each other, and to show what is common in technique and philosophy and what is specific to each.

Listed overleaf are details of the course textbooks, the tapes of radio programmes and the films of television programmes that are now available.

I trust that you will appreciate that this is very much an introductory letter. More details about Open University products are available on request, and any orders that you wish to place can be addressed to this office.

If you have any queries about any of these materials, or about any aspect of the Open University, please do not hesitate to contact me; I shall be only too pleased to help.

Yours faithfully,
J. COX
*Sales Manager*

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## SCIENCE FOUNDATION COURSE

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| | | | |
|---|---|---|---|
| 3–4 | Mass, Length and Time<br>Forces, Fields and Energy | £1.20 | Relativity<br>Force |
| 5 | The States of Matter. | 90p | Water, the eccentric fluid. |
| 6–7 | Atoms, Elements, Isotopes Electronic Structure of Atoms | £1.10 | John Dalton and his times |
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| | | |
|---|---|---|
| 24-25 | Major features of Earth's surface Continental movements, etc. | £1.10 Revolution in Earth Sciences. |
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|---|---|---|---|
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| 3. | Momentum Conservation | 16. | Cells in Action |
| 4. | Electromagnetic Forces | 17. | Genetic Code |
| 5. | The States of Matter | 18. | Cells and Organisms |
| 6. | Millikin's Oil Drop Experiment | 19. | Evolution of Natural Selection |
| 7. | Spectroscopy and Ionization Energies | 20. | Species and Populations |
| 8. | The Periodic Table | 21. | Unity and Diversity |
| 9. | Ionic Reactions | 22. | The Earth's Interior |
| 10. | Covalent Compounds | 23. | The Earth as a Magnet |
| 11. | Chemical Reactions I | 24. | The Earth's Surface Structure |
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This colorimeter is also available separately from the Hone Experiment Kit. It was designed by Foxall Instruments to meet the specifications set by the Open University for a robust instrument that is independent of mains electricity but is accurate and flexible in its use.

It is a 6v battery operated instrument with a stabilized voltage control circuit *incorporating* a Zener diode and transistor.

The colorimeter is ideal both for colorimetric work in university, school or technical college and for routine analytical work. Its probable price is £25.50; further details on request.

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* * *

In the discussion of the paper at the Seminar chaired by Dr. B. Ramamoorthy M.A.,D.Sc., formerly Regional Statistician, United Nations, there was general emphasis on the need to reconcile educational expansion with a maintenance of qualitative excellence. In the case of science one means of achieving this would be not to follow a disciplinary or interdisciplinary methodology at the primary school level but to begin with the facts of every day agricultural and rural life with which the child is surrounded. This way of dealing with common every day biological and botanical events which is fast spreading among the farmers would also be the means of developing a scientific temper in the community. For this the radio could be effectively used.

There is need for the high level scientists in the State being brought together as an advisory group to the Department of Education of the State in order to produce science kits and materials and develop a science centre which would be a materials centre, a curriculam development centre and provide a continuing service in the training of teachers in science. Such a programme could effectively supplement the large scale efforts of the Government to equip each secondary school with a science laboratory, to increase mobile science units in the districts and provide science kits to the primary schools. In all this effort it is impor-

tant that parents through parent teacher and other associations should play a full part in ensuring that the Government efforts of financing science education in primary and secondary schools are effectively supported. It was also agreed that the educational system should be so organised as to help in the identification of science talent wherever it may be found in the State and not be restricted as at present to urban centres. The general feeling was that with the willingness and support of the senior scientists in the State, the time is ripe now for a break through in integrated science education in schools and out of schools.

# BANKS AS INSTRUMENTS FOR PROMOTING GROWTH WITH STABILITY AND SOCIAL JUSTICE AND CANALISATION OF BANK CREDIT

**Targeted Growth.**

If banks are to be instruments for promoting growth with stability and social justice, they must have some quantifiable targets concerning the triple objectives of growth, stability, and social justice. It need not be emphasized that the three objectives could be and have been independent variables. Some countries of Latin America in the sixties, Brazil, Venezuela etc. registered high rates of growth in conditions of marked price and exchange instability. Taiwan, Korea and Mexico enjoyed high growth rates alongside of growing social inequality. As of today there are quantified indicators only for the first of these objectives of the country, namely growth. In the current 4th Plan period the major indicators are : [1]

Annual GNP increase of 5.5 per cent.
Annual population increase of 2.5 per cent.
Annual per capita income increase of 3 per cent.
Annual per capita real consumption increase of 2.5 per cent.
Annual agricultural production increase of 5 per cent.
Annual industrial growth of 8 to 19 per cent.
Annual increase of exports of 7 per cent.
Annual increase of imports of 5.5 per cent.
Annual rate of domestic savings of 8.8 to 13.2 per cent.
Annual rate of investment of 11.3 to 14.5 per cent.

Of particular importance to the Banking system is the target of increasing the savings/incomes ratio from 8.8 per cent in 1968-69

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* Extracts from a paper submitted by Dr. M. S. Adiseshiah to the Plenary Session of the Seminar on the Objective of Bank Nationalisation, Problems Confronted and Solution thereon, organised by the Union Planning Commission and the College of Rural Higher Education, Coimbatore, in October last.

1. IV 5 Year Plan (1969-74), Government of India Chapters, 2 and 3.

to 13.2 per cent in 1973, involving a marginal savings income ratio of 28 per cent. One assumption behind the target is a 300 per cent increase in Government savings.[2] These growth targets are established in macro terms. If the banks are to contribute to growth, these targets must be based on micro indicators, at the State, District and Block development levels. This issue however, relates to the methodology of planning in the country which is a separate subject.

**Untargeted Stability.**

For the second objective of stability there are no quantified indicators except in the case of foreign aid. Stability in the Fourth Plan has two major overtones—price stability and reduced reliance on foreign aid. In the absence of a target for price stability, targets for agricultural production, buffer stocks, import and export trade and their regulations have not prevented the continuous and the more recent catastrophic rise in prices, (General 6-7 per cent, food grains 25 per cent)[3] to which the banks have made an unwitting contribution. The deficit financing target for the Fourth Plan of Rs. 850 crores seem to have little relation to the deficit financing magnitudes already incurred during the first 2½ years of the plan period[4]. There is need for targeting the objective of price stability in over all and relative terms and by Country, Region and State if the banks are to contribute to the objective of price stability. Further a 50 per cent reduction in foreign aid net of debt charge and interest payments is targeted by the end of the Fourth Plan period.

**Social Justice : Targets**

The third objective of Social Justice has three dimensions, reducing concentration of wealth, promoting equitable modes of production and increasing the consumption level of the poor majority. The first dimension is fully in force in terms of legislation

2. R.B.I. Bulletin June 1971, Tables 2 and 18 (a).
3. Monthly Bulletin-Madras Development Seminar Series Volume 1 No. 8 pp 1 and 2.
4. Monthly Bulletin-Madras Development Seminar Series Volume 1 No. 7 p.1.

expressed in the tax system, licensing procedures, expansion of the public sector, the monopoly and restrictive practices Act, and to lesser extent land reform programmes. The second is being targeted in defining as priority economic sectors the backward regions and the small and marginal farmer, the small industrialist, the small trader and transport operator and the self employed. It is the third level of increasing the consumption level of the poor majority which needs to be targeted and the other two dimensions made a function of it.

**Banks and Growth.**

Within these limits, the banks' contribution to growth through (a) deposit mobilisation (b) branch expansion and (c) credit provision may be examined. The last instrument, namely, the provision of credit must also be examined from the point of view of the objective of social justice.

*Deposit mobilisation:* Banks have been the major means of mobilising savings. Since nationalisation they have registered an increase in deposits from Rs. 4502 crores in May 1969, to Rs. 5162 crores in May 1970 and Rs. 6080 crores in May 1971. The share of these deposits of the public sector banks has steadily increased from 83.1 per cent to 83.8 per cent on to 83.9 per cent respectively. The public sector banks were able to increase their deposits during the 2 year period by 36.4 per cent, the other scheduled banks increased theirs by 28.3 per cent.[5] Thus the banks have made a good start in relation to the savings target but they have yet a long way to go. The savings mobilized are still far short of the target envisaged in the Plan and of the credit needs of industry, agriculture and trade. One area where there should be a concerted drive for increased bank deposits through pushing up the savings of the household sector of the economy. Programmes of rural deposit mobilisation are urgent in view of the increasing rural surplus arising from the application of new agricultural technology to land. This growing rural surplus is currently being held in currency or jewellery in the case of small and medium farmers and speculative land holdings and stock building in the case of

5. R.B.I. Bulletin, June 1971. Tables Nos. 1, 3, 4 and 5.

large farms. Rural deposit mobilisation strategy must be based on the principle of local savings being used to meet local credit gaps and investment opportunities. The potential rural depositor should know that he is not being asked to join in a one way flow of deposit collection from rural areas being invested in urban and industrial centres. Before bank nationalisation the urban credit—deposit ratio was 88.9 per cent, while that of the rural was less than half, being 41 per cent. Five major cities in the country accounted for 42 per cent of deposits and 62 per cent of bank credit.[6] A policy of freezing resource flows between different areas is however, not suggested as post nationalisation policy. There must be the normal mobility for capital in the country. Such inter spatial resource flows should be a function of the growth of the investment habit in rural areas. The rural people should be as free as the urban to buy industrial shares, stocks and equities because they are competitive in terms of rural investment opportunities. As far as banks are concerned, the principle of investing local rural deposits in local enterprises, agricultural and non-agricultural, should be strictly adhered to.

The savings target is also being defeated because governmental savings instead of being somewhere around 4 percent of the national income is less than 1 percent. The correction of this trend has implications for improved performance of the public sector enterprises, profitable operations of multi purpose river valley programmes and reduction in the State government losses on power and irrigation projects.

To sum up, banks can further contribute to growth through intensifying their deposit mobilisation programme in the rural area. Other financial institutions can help in the acceleration of governmental saving.

*Branch Expansion:* Both the increased rate of deposit mobilisation recorded and the strategy for increased mobilisation of rural resources trace back to the rapid expansion in the number of new branches opened in the hitherto unbanked centres and areas. In the 21 month period, July 1969—March 1971, the

6. Organisational Framework for the Implementation of Social Objectives ; National Credit Council R.B.I. pp 8 and 9.

scheduled banks opened 3419 offices. The public sector banks account for over 70 percent of these new centres, 2934, located mostly in unbanked rural areas.[7] The bank expansion trend goes back to the fifties. Between 1955 and 1968, 4605 new branches were established, with over 70 percent in urban locations. 444 towns however had no banks, commercial or co-operative, Tamil Nadu being in the lead with 91 such towns. 27 percent of the new branches were in rural areas. Only 5000 villages out of 564 thousand were served by commercial banks. On the eve of nationalisation, the average bank office in the country covered 73 thousand persons compared to 4000 and 11000 in the United Kingdom and Iran.[8] The post nationalisation annual average of the number of new offices has been 1650 as against an annual average of 360 in the preceding period. Such a rapid expansion of branches has been necessary to make up both the gaps and imbalances in bank coverage. But this spectacular increase has had its price. The price paid has included the usual target achievement approach, the lack of coordination with existing co-operative credit institutions, high cost in terms of overheads and the lack in planning and modern management. The only index that is available for judging indirectly the cost of this expansion can be seen in the following table : [9]

Rs. Crores.

| | Offices | | Deposits | | percentage increase |
|---|---|---|---|---|---|
| | Total | Annual Increase | Total | Annual Increase | |
| June 1967 | 6620 | + 481 | 3517.0 | + 393.8 | + 12.6 |
| June 1968 | 7044 | + 424 | 3969 0 | + 452.0 | + 12.9 |
| June 1969 | 8045 | + 1001 | 4645.8 | + 676.8 | + 17.0 |
| June 1970 | 9938 | + 1893 | 5239.8 | + 594.0 | + 12.8 |
| June 1971 | 11554 | + 1616 | 6100 | + 1060.2 | + 17.3 |

7. Annual Report, Reserve Bank of India, June 30, 1971 page 37.
8. Organisational Framework for the Implementation of Social Objectives National Credit Council Statements 1, 2, 3, 4, 6, 10.
9. Annual Reports of the Reserve Bank of India, June 30, 1970 and June 30, 1971 pages 37 and 39.

During the first year of nationalised commercial banking out of 1893 new branches opened, 1700 were in the public sector which mobilised Rs. 67.0 crores as deposits. This works out at Rs. 4 lakhs per new branch against the average of Rs. 65 lakhs for an old branch. Here again the tasks ahead of the branch expansion programme are clear. First the lead bank scheme and its accompanying functions which are to undertake surveys of the districts for which it has been given responsibility is sound and has already produced results in the second year of nationalisation as the Table indicates. Through the surveys which identify growth centres and areas which are in need of banking facilities, the lead bank scheme is helping to fit the banking system into the investment needs and resources of each area. This area approach and involvement of the banks will ensure their contribution to the growth and development programmes and plans of the country and the locality. Secondly the location of new branches in growth centres and in co-ordination with other credit agencies notably the co-operatives will ensure a more rational coverage of the unbanked centres and at the same time make each centre more viable in terms of deposit intake. Finally there is need for use of known planning and management techniques in training the staff needed for this massive programme of branch bank expansion, for which probably the most serious bottleneck is the scarcity of trained and committed personnel in the many sided economic sectors which the local branches are called upon to serve.

**Credit Provision—Growth with Social Justice :**

*The Traditional Sector* : The direct contribution of banks to growth and social justice involves an examination of their financing of the various sectors of the economy. The first test in this double objective is the quality of lending in terms of (a) yield on the investment and (b) the normal routine recovery of the advances. This efficiency test can be applied in various ways. One measure would be the elasticity of an individual bank's deposits to the total advances of the banking system. As the latter increases, the deposits of each bank increases as a function of its efficiency. Using this relation or elasticity of a bank's deposits to total banking advances for the period 1951–68, it has

been computed that four banks—Canara, Syndicate, Maharashtra and Union—had the highest elasticity range of 1.56 to 1.3, while those at the lower efficiency levels had an elasticity of 0.6 to 0.45.[10] Also a close correlation between efficiency and bank expansion is seen. The more efficient banks show an annual percentage growth of 22 to 24, while those of the least efficient grew at about 1/3 to 1/2 at that rate. Still another application of the efficiency test is that the normal yield on investments should be based on the growth rate (realised or targeted) of the appropriate sector. If the growth rate targeted for industry is 12 per cent as the median target, then a sound project is one whose internal yield over the life time of the capital is 24 per cent. Yet another efficiency test in the case of an export oriented or import substitution project is that such project must earn or save in foreign exchange the exact amount of the rupee parity. If an import substitution project replaces a foreign product which is priced at £ 1, it must save Rs. 21 in foreign payments and not less, after the initial starting period that every project requires. So too must the export oriented project financing be based on the 1 : 1 principle. The evidence on all this is rather meagre. The operating results of the banks show that interest payments on deposits constitute a lower proportion (47.5 per cent) of the total operating expenses in 1970 as compared to 48.8 per cent in 1969. The net profit margin on the total income derived showed a fall from 2.5 per cent in 1969 to 2.3 per cent in 1970 for the nationalised banks. The trend for the private sector banks was the reverse.[11] Finally the recovery of advances picture is not very encouraging. The Reserve Bank repeatedly calls attention to the problem of outstandings and the persisting weakness in relation to growing over dues. Particularly in the case of the co-opera-

10. A. M. Khusro. An Econometric Model of Banking in India — Chapter 4.

11. Annual Reports of the Reserve Bank of India, June 30, 1970 and June 30 1971, pages 37 and 39.

tives, the State Governments have been advised to establish special schemes for each central bank to undertake a concerted drive for the recovery of overdues and for the strengthening of the administrative and supervisory arrangements for the timely recovery of loans. Even with such measures, the percentage of overdues to outstanding loans has registered a further increase from 35 in 1969 to 36 in 1970, particularly in such States as Tamil Nadu, Punjab and Maharashtra which are in the vanguard of the cooperative movement. The oustanding loans exceeded the owned funds of the central banks.[12] Judged by any of these criteria and on the basis of the meagre data available, I can only conclude that the efficiency of the banking system is unproved, that it is of varying orders of magnitude and that in any case it is an objective to which banks must strive if they are to contribute to growth.

Some practical suggestions to improve the efficiency of the banking system and enhance its contribution to growth include: (a) increasing investments in the large scale sector of the industry; (b) intensifying investment in selected and priority industries including those with long gestation period on which the country's self sustaining growth depends; (c) helping in the development of suitable investment projects which are now scarce in relation to total resources; (d) increasing advances to traditional sectors to relieve unneeded stringency in corporate finance; (e) building sound traditions for timely repayment of loans.

*The Neglected Sector:* A further major contribution of banks to growth with social justice is in the accelerated trend of advances by the public sector banks to what has been termed the neglected sector — the small farmer, the small industrialist, the small trader, the self employed and the transport operator. In this area the credit criterion test shifts from the collateral of the borrower to the viability of the project. This is seen in the rapidly growing trend of bank advances to the neglected sectors, now called the priority sector as set forth in the table below: [13]

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12. Statistical statements relating to the Cooperative movement in India 1969 — 70. R.B.I. July, 1971.
13. R.B.I. Bulletin 1971: Tables 3, 4, 5, 9.
Annual Reports of the Reserve Bank July 1970 and July 1971.

# ADVANCES OF PUBLIC SECTOR BANKS TO PRIORITY SECTORS

| *Sector.* | *No. of borrowals.* | *Advances Rs. lakhs* | *No. of borrowals.* | *Advances Rs. lakhs* | *No. of borrowals.* | *Advances Rs. lakhs* |
|---|---|---|---|---|---|---|
| | | *June 1969* | | *June 1970* | | *June 1971* |
| **Agriculture** | | | | | | |
| A. Direct Finance | 171,880 | 38,02 (1.26) | 615,952 | 153,45 (4.27) | 795,745 | 198.80 (5.05) |
| B. Indirect Finance | 4,756 | 122,32 (4.05) | 18,846 | 139,08 (3.87) | 17,710 | 129.06 (3.28) |
| **Small Scale Industry** | 73,987 | 251,06 (8.34) | 121,057 | 369,89 (10.30) | 139,390 | 440.47 (11.20) |
| **Road Transport Operators** | 2,527 | 6,69 (0.22) | 12,690 | 24,74 (0.69) | 21,794 | 39,62 (1.00) |
| **Retail and Small Business** | 28,037 | 19,22 (0.64) | 125,748 | 64,87 (1.81) | 148,389 | 76,65 (1.95) |
| **Professional & self employed** | 422 | 33 (0.01) | 28,879 | 6,75 (0.19) | 40,427 | 8,92 (0.23) |
| **Education** | 594 | 46 (0.02) | 4,995 | 2,07 (0.06) | 6,856 | 3.76 (0.10) |
| Total ... | 282,203 | 438,50 (14.54) | 928,167 | 760,83 (21.19) | 1,170,311 | 897,28 (22.81) |
| Total advances ... | | 30,16,76 (100.00) | | 35.91,14 (106) | | 39,34 37 (100.00) |

Between June 1969 and March 1971 priority sector borrowals increased from 2.8 lakhs to 11.7 lakhs and advances more than doubled from Rs. 439 crores to Rs. 897 crores. Fifty per cent of the increased advances during this period (Rs. 459 crores out of Rs. 918 crores) were made to the neglected sector, involving use of one third of the additional deposits that have been mobilised. Even more, under the impetus of the special credit guarantee corporation, direct finances to farms jumped from Rs. 38 crores to Rs. 199 crores. Such direct finances are loans to small farmers owning less than 5 acres. They represent 50 per cent of the total number of borrowers. To this should be added, the credit to the priority sector made available by private commercial banks which was around 10 to 12 per cent of the public sector advances. The co-operative credit institutions whose advances are about 3 times those of the public sector banks as well as the financing activities of the IDBI to the small industrialist should also be taken into account.

One issue in promoting growth with social justice relates to the proposal for differential rates of interest for the neglected sector. I agree with the rates proposed by the committee wherein the rates would vary from 8½ to 9½ per cent for the neglected sector (In Tamil Nadu the cooperative rate is around 7 per cent). In applying these rates, there are however four other considerations which are equally important to spur growth in an equitable manner. First the eligibility for these rates should be based on the size of the farm or industry or trade and not on the size of the account. Second the rates should apply to all financial institutions providing credit to the neglected sector and not only to the nationalised commercial banks. Third, the wide range of cooperative rates varying from 6 – 12 per cent between and within States must be made uniform. Finally institutions and legislative devises are needed to ensure that the credit really reaches the small farmer, trader or industrialist and is utilised by him. The Tables, published on pages 5 – 7 of Vol. I No. 7 of the Bulletin, derived from a recent survey of Tamil Nadu poses the problems concerning the source, use and cost of credit to the small farmer in the State. [14]

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14. Monthly Bulletin Vol. I No. 7 Madras Development Seminar Series pages 5 to 7.

Among other matters, these Tables highlight the following : (a) private money lenders and their high cost credit are the major source of credit for the smallest farmers, (b) commercial banks credit is marginal, (c) the credit gap is largest for the smallest farmer, (d) co-operative credit is important for medium size farmers. Long term loans and repayment procedures and traditions are serious bottlenecks. The institutions which should be further developed and used in this situation are the government agencies including the Small Farmers Development units and the co-operative Societies, with commercial banks allocating an increasing percentage of their loan facilities to these two agents. The institutional change called for is with regard to the money lender and the control and management of the co-operative societies which should be vested in the hands of the small farmers. The current controversy over differential interest rates is somewhat misleading. Actually there might be a case for some rise in cooperative credit rates to ensure that the loans given to the small farmer are really used by him and not turned over to the land holding money lender who reissues the loan to him at over 30% interest. It is not the rate of interest of the commercial bank that needs lowering : it is for its credit facilities to be institutionalised and be made available easily and definitely to the farmer through agencies that he knows and controls.

Thus the nationalised banking system has made considerable progress in its advances to the neglected sectors but has not yet broken the institutional bottlenecks in the distribution of agricultural credit. The last report of the Agricultural Refinance Corporation shows that commercial banks put up only 25 per cent of its approved schemes. Of the total assistance of Rs. 293 crores, less than 7 per cent (Rs. 18.52 crores) was sponsored by the banks and the majority of them were concentrated in a few States.[15] In addition to the institutionalisation measures proposed above, changes in State legislation are required for the banks to continue and speed up their assistance to the small farmer and avoid the slow down in the rate of advances to agriculturists. The amendments to State Legislation must correct existing provisions under which the cultivators have no rights of alienation, the share crop-

15. Annual Report of Agricultural Refinance Corporation June 1971.

pers have no recorded rights, there is lacking any general principle regarding priority of loans received from different agencies etc. It is now necessary for the States to act quickly to remove current legislative restrictions and conflict generating factors between lending agencies by using and adapting the model bill suggested to them by the RBI for this purpose.

Another neglected area of agricultural credit is dry farming. Dry farming research has now reached a stage when the financing of a package—type development can be applied to dry farming to promote use of new seeds and fertilisers, to prevent erosion and introduce water harvesting techniques. In fact interest in wet farming is now so high that its financing can proceed on its own momentum. The contribution of banks to growth requires that they now turn to financing dry farming. The decision of the Agricultural Refinance Corporation to shift the emphasis of its assistance to dry farming is therefore timely and demands the full co-operation of State governments in the preparation of package schemes for their dry farming areas and of State co-operative banks and commercial banks to take real advantage of the refinance facilities for dry farming offered by the Corporation.

*Poverty pockets.* Another bank instrumentality to promote growth with social justice is in bank assistance to the prospecting and development of the underdeveloped and backward areas of the country. Nine States and some fifty districts in other States have been identified as backward by the Central Planning Commission. The banking and credit system of the country offer concessional finance in order to spark growth in these territories through low interest rates, long grace periods for repayment of capital, reduced commitment charges on loans, subscribing to risk capital, liberal refinance facilities to banks and State finance Corporations etc.,—in other words through soft loan facilities. In addition, the IDBI in co-operation with RBI and ICIC is undertaking industrial surveys of backward regions.[16] Three such States Surveys have been completed and three are under way. On the basis of these techno-economic surveys, specific projects are being formulated, entrepreneurial talent mobilised and the start of

16. Annual Report IDBI June, 1971.

industries assisted. There is need for some acceleration of this much needed programme, together with the need to transform the general guide lines and the ad hoc decisions on the terms of credit provision to industrial initiatives in the backward region into established and accepted criteria. The IFC and Small Industries corporation should push more vigorously in the direction of setting up small industries and industrial estates in these areas.

To sum up, for banks to promote growth and social justice particular attention needs to be paid to (a) means of not only maintaining but also of expanding the rate of credit facilities to the corporate sector (b) speeding and regularising the procedures for providing credit to the small sector and poverty pockets (c) improving staff and labour management as that the constant go slow and work stoppages in the banking system which paralyse the entire economy are avoided, (d) further institutionalising the flow of credit to the small farmer including early amendments to existing State legislation, (e) extending the needed concessional credit to the dry farmer.

**Banks and Stability.**

Finally a word about stability. It is here that the banking system has made little or no contribution. Of course the price inflation now under way goes beyond the reach of the banking system or the scope of monetary factors. They relate to bottlenecks in the distribution of food articles, shortfalls in commercial crop output, the shortages in industrial raw materials, the serious lack of industrial peace and the continuing losses of the public sector undertaking. But the credit control policy and instruments of the banking system as a whole have also made their contribution. They have not prevented speculative stock building by traders and large farmers. They have not been able to prevent a lopsided money and credit expansion. They have not been able to compensate, through an accelerated mobilisation of savings, for the fact that the priority sectors cannot come under the control instruments. Further one of the conclusions of the deposit models referred to earlier is that the demand for advances of the banking system though responsive to the state of business, is not responsive to the yield on advances, so that a rise in deposit rates

accompanied by a rise in the interest rates on advances does not diminish advances.[17] This is true. As the annual reports of the various companies show, their demand for advances is not diminished because the increased rates on advances become part of the cost push factor of the business concerns and are usually passed on the consumer, adding to the inflationary spiral.[18]

The money supply position has aggravated the price instability situation. Between September 1970 and September 1971 money supply has increased by 13 per cent if currency and demand deposits are taken to account, and by 15½ per cent if time deposits are also included. Bank credit to government has increased during the period by 20 per cent from Rs. 4821 crores to Rs. 5763 crores. Bank deposits have increased by 20 per cent, representing both saving and credit borrowed, with overall growth at around 5 per cent and the money supply increase at 12 to 15 per cent, the quantity theory of money which is inoperative in most countries, finds its fullest operation and validation in this Country. During this one year period the wholesale price index has been risen by over 5 per cent from 183.2 to 192%[19]. As the index base is 1961, we are ending the decade 1961-1971 with a 50 per cent fall in the value of the rupee. The inflation impact and the cost of the Bangla Desh refugees call for short and long term action—increased production, expanded investment, accelerated savings, further taxes and cuts in plan and non plan expenditure. The banking system must through its credit policy and control instruments keep the supply of money nearer the growth rate of the economy. It must be provided with certain targets as regards prices and incomes. A point of no return has now arrived where in an effective credit and investment policy and plan require as their pre requisite a price/incomes policy.

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17. A. M. Khusro An Econometric Model of Banking in India-Chapter 4.

18. Annual Reports of the Aluminum Industries, IFC, Hindustan Teleprinters, SIMCO, and MRF, Mysore Electricals, India Cements etc.,

19. Weekly Statistical Supplement to RBI Bulletin Vol. XXII No. 35

**A Concluding Comment :**

With the nationalisation of commercial banks, preceded by that of L.I.C. and followed by that of General Insurance and with the Reserve Bank of India gradually becoming an arm of Government, the State, in the form of Central Government, emerges as a financial giant, occupying not only the commanding heights but the entire terrain of capital and credit resources. This has three consequences. First democratic and decentralised planning, planning from below, becomes a theoretical exercise because it has no resource base. Credit and institutional decentralisation are needed to make planning, democratic. Second the private sector including agriculture ceases to have any initiative and significance as all credit and capital for it must now flow from government. The market forces regulating mobilisation and allocation of credit are now replaced by State decisions. Third the State at all levels needs a new type of policy planners, men of entreprenerial, managerial and administrative capacity to take on this capital and credit mobilising and allocating role.

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# SEMINAR ON CONSUMER—USER ORIENTED RESEARCH

*Presidency College, Madras, September 17–19, 1971*

## A SUMMARY REPORT

**A business-cum-government-cum-academics meeting :**

For the first time in the State, representatives of the public and private sector. Secretaries of Government Departments, and research specialists from the five Universities and two research institutes in Tamil Nadu came together on the initiative of the Madras Institute of Development Studies, and the Indian Council of Social Science Research, in a three day Seminar, September 17-19, at the Presidency College, Madras to discuss Tamil Nadu Development problems, analyse the Fourth Five Year Plan of the State, talk about the difficulties and bottlenecks that business firms, agriculture and Government departments face and to establish on this basis a list of research priorities for work by the Universities, national and State Laboratories, and the research Institutes. The Seminar brought together ten public and private sector managements, ten Government departments and thirty research specialists from the Universities, national laboratories and research institutes.

**The Call of the Ministers :**

Thiru Si.Pa. Aditanar, Minister of Co-operation, who opened the Seminar highlighted the problems of Agriculture which is Tamil Nadu's industry and its income and employment generating potential. "If the 3 crores of our rural people could use the potential of new seeds, new fertilizers and the new technology represented by the water-saving floor on the 3 crore acres of our farm lands, then our per capita income will shoot up from Rs. 500/- to Rs. 3,000/-. So concentrate your studies on the Agricultural potential and its break through," he said. Thiru Madhavan, Minister of Industries welcomed this first novel attempt by the industrialists and economists to establish a programme of research priorities for the years 1971-74 to accelerate Tamil Nadu Development.

**Private and public sector needs** :

The private sector problems were highlighted by Mr. M. V. Arunachalam, Managing Director, Tube Investments: How can we develop our industries on local, indigenous materials? he asked. Mr. N. Mahalingam Chairman, Sakti Sugars Ltd; Steel Planning and sugar and textile studies are vital, he said, and Mr. S. Narayanaswamy, Vice-President, Southern India Chamber of Commerce: How can agriculture be made more viable and how can small industry develop effectively, he questioned. For the public sector, Mr. Sundar Raj of the Integral Coach Factory stated that the major problem in the public sector is our social behaviour. Mr. Chakravarty, Director, MERADO agreed that the desiderata for development is that we Indians must have confidence in ourselves and in our products. Mr. Raghavan of the Bharat Heavy Electricals called for studies to raise the scientific and educational standards of the University graduates entering industry.

**Government Problems** :

The Government Departments brought out, in the words of Mr. Karthikeyan, Secretary of the Department of Industry, the urgent need for study, costing and correct project planning: in the words of Mr. Z. Khan, Joint Director, Agriculture, the research requirements for varying our production in terms of nutrition now that we have reached self-sufficiency in food; in the words of Mr. Ambasankar, Secretary, Health and Family Planning the need for light on the dark areas in family planning and the means of filling the gaps in the programme of eradication of communicable diseases: and in the words of Mr. Diraviam, Secretary of Education the need for studies on reconciling continuity and innovation in education, quantity and quality and a whole host of problems from craft centred education to educational statistics; Mr. Padmanabhan, Director, Small Industries, pleaded for market research to ensure quality production and most consumer preferences and warned against the current business bias for profits regardless of costs.

**The Research View** :

The time has now come to harness research to the chariot of Tamil Nadu development and for this use all the tools available

and adapted to our needs should be used. The finance for such research must be found by Government (Dr. G. R. Damodaran, principal PSG College of Technology, Coimbatore). Research is not a felt need, the private sector relying on political pressures and the public sector relying on time and bureaucracy to solve its problems. Planning has now come to stay and that means resarch is an essential tool for development (Dr. B. Natarajan, Chairman, Institute of Techno-Economic Studies). Unless consumers' felt-needs are met, no Plan is of any use. Adequate nutrition can save Rs. 1,000 crores annually (Dr. Rajammal Devadoss, Principal Home Science College, Coimbatore). Research in Desalination, biomedical engineering and pollution is now our priority (Dr. R. K. Gupta, Indian Institute of Technology). We need research on some of our policies which are empty slogans. Why is agriculture tax exempt, why do we say we have reached the limit of savings while our rural people waste 13 per cent of their income on jewellery, tobacco and alcohol ? (Dr. Bright Singh, Professor of Economics, Madurai University). Research on protein rich rice varieties is the answer to our deep-rooted malnutrition. Studies in the IADP areas are needed (Dr. Srinivasan, Research Director, Department of Agriculture). In light of industry and inter-State competition, we need to transform, re-structure, close down some and open new modern industries in Tamil Nadu. Development of entrepreneurial talent and economic administration in Tamil Nadu are urgent (Dr. Shanmugasundaram Professor of Economics, Madras University). In view of changes in our monsoons, upset in our ecological balance and growing scarcity of agro-based industrial materials, research on Tamil Nadu forest policy is now a must (Prof. K. Sonachalam, Member, Railway Rates Tribunal, Madras). Is our ante-deluvian and wasteful education really a contribution to social justice as we claim ? Is our rigid, bureaucratic higher education an exercise in democracy ? Where is educational research in Tamil Nadu ? (Dr. C. Devanesan, Principal, Madras Christian College and Mr. V. Titus, Director of Collegiate Education). Why is it that 95 per cent of our married couples know about and only 16 per cent practise family planning ? Why have the health hazards of urban centres been neglected ? (Dr. C. M. Abraham, Reader in Sociology, Madras University). We need a standing research council which can restore communication between research users and producers (Dr. T. Nair, Director,

Madras School of Social Work). Research into Housing needs, rural and urban and roads as infra-structure and employment generating are needed. (Mr. Ramaswamy, Professor of Economics, Annamalai University). Research finance and co-ordinating the producers and consumers of research are two urgent needs for Tamil Nadu (Dr. C. T. Kurien, Professor of Economics, Madras Christian College).

**Call to Action :**

On the closing day, Dr. Sundaravadivelu, Vice-Chancellor of Madras University as President and Thiru M.G. Raja Ram, Deputy Chairman, State Planning Commission, as Deputy President for the entire Seminar reminded the participants of their obligations at this meeting. Development research is badly needed today in Tamil Nadu and the Universities must respond to this call. This should not replace the fundamental research vacation of the University and the academic freedom of these institutions should be fully respected. The institutions need finance for this new field of development research and what we need is action.

**Highlights of Action Decision :**

On the basis of a draft decision for a three-year programme of Research priorities presented by Dr. Malcolm S. Adiseshiah and Prof. K. Sonachalam, the Seminar after various amendments and additions accepted unanimously the decision, which was published in the last issue (No. 9) of the Bulletin. The twenty-two paragraph resolutions unanimously adopted by the Seminar has the following highlights :

1. Development oriented research is essential for fulfilling the targets in the Tamil Nadu Fourth Plan.
2. Such research does not exist today and is requested or felt by the private or public sector or Governments.
3. There are 229 priortity research themes in Tamil Nadu Development to be investigated in the three years 1972-74:

   A. General Themes : .......................... 20

   B. Industry -do- .............................. 47

| | | |
|---|---|---|
| C. | Agriculture -do- | 40 |
| D. | Education themes | 33 |
| E. | Employment -do- | 12 |
| F. | Health and Family planning themes | 14 |
| G. | Fiscal and credit themes | 8 |
| H. | Power themes | 9 |
| I. | Housing and Public Works themes | 18 |
| J. | Welfare themes | 10 |
| K. | Nutrition themes | 13 |

4. The five Universities and their affiliated colleges, other institutions of higher learning, the five research bodies and the three national and State Laboratories in Tamil Nadu offer to divide these themes among themselves on the basis of their locational interests and technical expertise.

5. Tamil Nadu Government is requested to allocate one per cent of its Annual Development Budget and 20 per cent of its basic land revenue collection (instead of abolishing it) to finance this development oriented research by the research institutions.

6. The State Planning Commission is requested to set up and operate a Development Research Council on which the Government, public and private sector, Universities and research institutes and laboratories are represented to continue this dialogue, co-ordinated the research effort and facilitate its financing.

7. The Madras Institute of Development Studies will follow up this decision and through its monthly bulletin keep all research producers and consumers in Tamil Nadu informed about the follow-up action.

**Postscript :**

The Seminar was prepared over a period of six months and hence attained the main aim of bringing research consumers and research producers together to discuss frankly their mutual weaknesses and the tasks of facing them. There were moments of intellectual tension and controversy, which was a healthy sign that real issues were being really debated. As usual the time for a thorough discussion of the problems was insufficient. The seminar could not agree either on a precise division of tasks between the Universities and research bodies nor as to the priorities within the priorities. Its financial recommendations were somewhat irresponsible. The tradition of sitting through the entire three days of the Seminar has not yet developed. There was a little too much coming and going. Now everything depends on practical follow-up action by business, Government and the University. That is the proof of the pudding so attractively cooked at the Seminar.

# CORRESPONDENCE

## A NOTE ON "PROBLEMS OF SUBURBANISATION"

From Mr. R. K. SAMPATH, M.A.,

Research Assistant,

Madras Institute of Development Studies

The purpose of this note is to make a few observations and raise some questions on Dr. Kurien's paper on "Problems of Suburbanisation."

1. In his estimation of per cent variation in urban population during the period 1931-61, Dr. Kurien has overlooked the problems posed by the differences in the definitions adopted by the 1951 and 1961 censuses.

According to the definition of 'urban' adopted in the 1951-Census "A Town is normally an inhabited locality with a total population of not less than 5,000 persons. But places with a somewhat larger population which do not possess definite urban character may not be treated as towns. At the same time, places with a smaller population with definite urban character may be treated as separate towns." *

The census towns in 1961 were determined on the basis of the following tests:

"(a) a density of not less than 1,000 persons per square mile;

(b) a population of 5,000;

(c) three-fourths of the occupation of the working population should be outside of agriculture; and

(d) the place should have a few pronounced urban characteristics." **

* Census of India, Vol. I, Part II-A, p. 2.

** Census of India Paper No. 1 of 1962, introduction, p.xxxvii.

After making adjustments for definitional differences, Mr. Assish Bose arrives at the following estimation of present variation in urban population during 1931-61 which differs significantly from Dr. Kurien's :

TABLE 1

* The 'Adjusted' per cent variation in population during

| *Class of towns* | 1931-41 | 1941-51 | 1951-61 |
|---|---|---|---|
| Class 1 | 64.5 | 63.9 | 48.0 |
| Class 2 | 32.3 | 33.8 | 27.6 |
| Class 3 | 23.4 | 40.8 | 40.5 |
| ** Class 4, Class 5, Class 6 | 11.5 | 22.5 | (—) 7.2 |
| All towns | 31.1 | 41.2 | 37.7. |

2. The available empirical data do not support Dr. Kurien's second hypothesis that Industrialisation accounts for the existence and growth of the suburban towns.

TABLE 2

**Per cent increase in urban population of different classes : § 1901—1961**

| | *Clas I* | *Class II* | *Class III* | *Classes I, II & III Combined.* | *Classes IV, V & VI Combined.* | *Total Urban.* |
|---|---|---|---|---|---|---|
| 1931-41 | 64.5 | 32.3 | 23.4 | 45.6 | 11.5 | 31.1 |
| 1941-51 | 63.9 | 33.8 | 40.8 | 51.9 | 22.5 | 41.2 |
| 1951-61 | 48.0 | 27.6 | 40.5 | 42.4 | — 7.2 | 37.7 |

* Mr. Bose combines these 3 classes of towns and calls them " quasi towns "

** For a detailed account of the procedure of estimation, see " Urbanisation in the fact of rapid population growth and surplus labour—The Case of India by A. Bose.

§ Source : A. Bose, Op. Cit.

## TABLE 3

### Rate of Urbanisation

| | | | | | | |
|---|---|---|---|---|---|---|
| 1931-41 | 43.97 | 15.79 | 7.87 | 27.40 | — 2.33 | 14.67 |
| 1941-51 | 44-51 | 14.29 | 24.46 | 33.90 | 7.94 | 24.66 |
| 1951-61 | 21.61 | 47.85 | 15.58 | 17.12 | — 23.64 | 2.32 (unadjusted) 13.91 (adjusted) |

Tables 2 and 3 indicate a definite decline in the rate of urbanisation (measured as per cent variation with proportion of urban to the total population) in the decade 1951-61 compared to earlier decades. Here it must be borne in mind that the decade itself is one of rapid industrialisation and one would have expected an increase in the tempo of urbanisation. But the 1961 census, on the contrary, indicates a slower tempo of urbanisation in a decade of an increasing tempo of industrialisation, a phenomenon that deserves a careful study by demographers and Economists.

3. One important omission in Dr. Kurien's paper is that it does not deal with the real factors that affect the growth of urban population explicitly. The real factors which affect the growth of population in a given decade are

(a) natural increase in population of urban areas ;

(b) net migration into urban areas, and

(c) re-classification balance.

The Westerners emphasise the role of rural-urban migration for the growth in urbanisation. Dr. Kurien also seems to be concerned more with this factor than with the other two factors in his paper. But in India the chief determinant of the growth in urbanisation is the natural increase of population as is evident from the table below :

**TABLE 4**

**Components of urban growth 1951-1961**

| | *Millions* | *Per cent* |
|---|---|---|
| Natural increase | 11.50 | 55.69 |
| Net migration | 4.62 | 22.37 |
| New Towns | 4.53 | 21.94 |
| | 20.65 | 100.00 |

Thus Dr. Kurien's pattern of urbanisation in India is based entirely on the Western pattern of urbanisation. It is a natural phenomenon in India, whereas in Western countries, it was induced by industrialisation. So obviously the problems posed by urbanisation in India will be entirely different from the problems posed by urbanisation in Western economies during their period of urbanisation.

The implication of our analysis in terms of economic development is that urbanisation in the face of rapid population growth has built-in obstacles in the form of a surplus labour force in the urban areas which has to be liquidated before there is any scope for a significant shift of population from the rural to the urban areas. It not only slows down the tempo of urbanisation, but worsens the situation in rural areas. While the pressure of population on land goes on increasing, the channels of rural-urban migration are closed or narrowed down on account of the "push-back" from urban areas.

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